Asbestos Inspector Refresher Training Course

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Asbestos Building Inspector Refresher

Section 1
Pre-Inspection Activities

Reasons to Conduct an Inspection
• Liability Reduction & Safe Building Environment
• Property Transfer
• Regulatory Compliance

Liability Reduction & Safe Building Environment
• Conducting a comprehensive survey
  – State of art practices
  – Inspector’s duty
    • thoroughly identify and assess
    • accurately report the findings
    • recommend methods to control asbestos

Liability Reduction & Safe Building Environment
• Implementing effective management controls
  – Implement controls
  – Continuously manage

Property Transfer
Recognized Environmental Conditions
Protocols
• rarely comprehensive
• usually identify only limited suspect materials (i.e. friable)
• limited assessments (i.e. damaged materials)
• few samples in a facility
Regulatory Inspection Requirements

- **AHERA 40 CFR Part 763 Subpart E**
- **OSHA Construction Standard 29 CFR 1926.1101**
- **NESHAP 40 CFR Part 61 Subpart M**
- **States**

**Regulatory Comparison**

|-------|------------------------|---------------------------------------|-----------------------------------|----------------------|
| Facilities | Schools (K-12) Public & private not-for-profit | All buildings w/ employees, exception: construction & offshore | All areas employing asbestos will perform correction activities | All structures excluding residential buildings 
| Identify | Building-wide: interior, accessible | Employees’ areas accessible | Employees’ areas accessible & inaccessible | All related areas of facility accessible & inaccessible |
| Detect | AHERA protocol or assume | AHERA protocol or assume | AHERA protocol or assume | NESHAP protocol or assume |
| Assess | - Location - Condition - Potential for Disturbance - Quantity | - Location - Quantity | - Location - Condition - Potential for Disturbance - Quantity | - Location - Condition - Potential for Disturbance - Quantity |

ASTM Asbestos Survey

<table>
<thead>
<tr>
<th>Baseline Survey</th>
<th>Project Design Survey</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Entire facility:</td>
<td>- Limited to abatement areas</td>
</tr>
<tr>
<td>* Indoor &amp; outdoor material*</td>
<td>* Supports abatement*</td>
</tr>
<tr>
<td>* Includes miscellaneous items &amp; stored materials*</td>
<td>* All suspect ACM sampled*</td>
</tr>
<tr>
<td>* Long-term ACM management*</td>
<td>* Destructive testing often needed*</td>
</tr>
<tr>
<td>* Sampling &amp; assuring permitted*</td>
<td>* No assessment unless abatement decisions have not been made*</td>
</tr>
<tr>
<td>* No destructive testing/surface damage*</td>
<td>* Supports NESHAP requirements to thoroughly inspect prior to renovation/demolition*</td>
</tr>
</tbody>
</table>

New Buildings & Materials

Need to inspect?

- **Yes**
  - Ban issues
  - PACM
  - AHERA Exemptions
  - MSDS’s
  - State requirements

Active U.S. Ban Legislation

- Senate passed **Ban Asbestos in America Act**
  - Bans nearly all asbestos uses
  - Exempts naturally occurring fill material
  - Other exemptions include DOD, NASA, & chlorine process

Current Asbestos Bans and Restrictions

- **Argentina**
- **Austria**
- **Chile**
- **Czech Republic**
- **Estonia**
- **France**
- **Germany**
- **Honduras**
- **Iceland**
- **Italy**
- **Kuwait**
- **Lithuania**
- **Malta**
- **Norway**
- **Portugal**
- **Poland**
- **Russia**
- **Saudi Arabia**
- **Spain**
- **Sweden**
- **United Kingdom**
- **Uruguay**
- **United States**
- **Uruguay**
- **Venezuela**
- **Vietnam**

- **Ireland**
- **Japan**
- **Latvia**
- **Luxembourg**
- **Netherlands**
- **Nepal**
- **Saudi Arabia**
- **Spain**
- **Switzerland**
- **Ukraine**
- **Uruguay**

Similar bill in House committee

Training Services International
Selecting an Inspection Firm

1. Scope of Work

<table>
<thead>
<tr>
<th>Owner Responsibilities</th>
<th>Inspector Responsibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Convey why they are conducting the survey including:</td>
<td>Thoroughly review bid documents</td>
</tr>
<tr>
<td>• Intended use for survey report</td>
<td></td>
</tr>
<tr>
<td>• Who will use survey report</td>
<td></td>
</tr>
<tr>
<td>• Regulatory requirements to be fulfilled</td>
<td></td>
</tr>
<tr>
<td>• Activities following survey</td>
<td></td>
</tr>
<tr>
<td>Provide information including:</td>
<td></td>
</tr>
<tr>
<td>• Drawings &amp; specifications</td>
<td></td>
</tr>
<tr>
<td>• Previous inspections</td>
<td></td>
</tr>
</tbody>
</table>

2. Site Visits

- Complexity determines need
- Individual or group visits
- Information available
  - Plans & specifications
  - Overview of building processes
  - Finalize scope & purpose of inspection
  - Schedule inspection, escorts, & access

3. Bidding Format

<table>
<thead>
<tr>
<th>Lump Sum</th>
<th>Unit Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Document review</td>
<td>PLM analysis</td>
</tr>
<tr>
<td>Pre-inspection meetings</td>
<td>Point count analysis</td>
</tr>
<tr>
<td>Walkthrough &amp; identification</td>
<td>TEM analysis</td>
</tr>
<tr>
<td>Field sampling</td>
<td>Non-typical materials</td>
</tr>
<tr>
<td>Report writing</td>
<td>Report review</td>
</tr>
</tbody>
</table>

Certifications & Qualifications

AHERA 40 CFR Part 763 Subpart E

- Inspector
  - 24 hr MAP Course
- Management Planner
  - 16 hr MAP Course

ASHARA

- Inspector
  - 24 hr MAP Course
- Management Planner
  - 16 hr MAP Course
Certifications & Qualifications

OSHA Construction & General Industry
- AHERA inspector or CIH for pre-1980 TSI or surfacing (PACM)
- Industrial hygienist for pre-1980 flooring
- AHERA inspector or CIH is recommended to fulfill 'due diligence' requirement

Certifications & Qualifications

NESHAP 40 CFR Part 61 Subpart M
- No requirements identified, however, AHERA inspector is recommended to fulfill 'thoroughly inspect' requirement

State Licenses
- Inspector
  - 24 hr MAP Course
- Management Planner
  - 16 hr MAP Course
- Application & Fee

Notifications

Functions
- Limits confrontations during inspection
- Building occupants are informed of potential hazard
- Informed occupants less likely to disturb ACM
- Early and full disclosure may reduce legal liabilities

Approaches
- Communicate with all affected parties
- Bring it up early
- Tell the truth

Methods
- Notices
- Signs
- Meetings
Notifications

AHERA 40 CFR Part 763 Subpart E
• Annual
  – Occupants & legal guardians

OSHA 29 CFR 1926.1101
• Building & facility owners
  – Employees, tenants & occupants in adjacent areas
• Contractor (Inspector)
  – Other employers (contractors)

Notifications

None to conduct inspections
– NESHAP

State requirements vary

Building Records

Drawings
Assists inspector to locate ACM within the building and identify the building systems
Improves the quality of the asbestos inspection report
Various types of drawings

Building Records

SYMBOL DRAWING COMPONENTS
A Architectural Floor plans Miscellaneous finishes
M Mechanical Mechanical thermal system insulation
P Plumbing Plumbing thermal system insulation
S Structural Building grid plans Structural component insulation (usually fireproofing)
E Electrical Wires, transformers, panel boxes

Review of Building Records

Site Plan
Floor Plans
Abatement Records
Plans & Other Construction Documents
Previous Inspections
1. Provides a starting point
2. Identified ACM should be verified
3. Inadequate parts should be repeated.
4. Helps to know who did it
5. Should know why it was done

Liability Concerns

Inspection Report
- Foundation for all asbestos activities
- Future actions rely on asbestos inspection

Regulatory Liability
- Certification & performance issues
- Laws & statutes
- Enforcement trends
- Letters of interpretation

Criminal Liability
- Knowingly & willful
- Damages human health & environment

Civil Liability
- Contractual – agreement violation
- Tort – legal wrong

Inspector’s Liability

Regulations
- Identify all regulations applicable to the inspection activity
- Review the sections of each regulation that apply
- Comply with most stringent requirements

Contract
- Read & become familiar with if not developed by inspector
- Develop proposals/contracts that are specific for each project
- Explain in detail what is to be done
- Identify limitations to the survey scope

Inspection Report
- Explain what was done in detail
- Identify limitations to the survey scope
- Provide definitions for key terms
- List findings clearly
- Make sure lab results, reported findings & drawings agree
- Have the report carefully reviewed by a qualified individual
**Health Effects of Asbestos**

- Primary route of exposure is inhalation
- Secondary route is ingestion
- Latency Period of 10-40 years
- 10,000 deaths/year
- Most affected trades:
  - Mining
  - Milling
  - Manufacturing
  - Insulating
  - Ship building
  - Construction

**Asbestos Diseases**

- **Asbestosis – White Lung**
  - 1,500 deaths/year
  - 20,000 hospital visits
  - Shortness of breath common symptom
  - Dose-response relationship

- **Lung Cancer**
  - Increased risk from smoking 10x
  - Increased risk from industrial asbestos exposure 5x
  - Combined increased risk over 50x
  - Cancer of the lining of the chest cavity or abdomen.
  - 2,500 deaths/year
  - Rare Cancer
  - No dose-response relationship
  - Always fatal
Asbestos Diseases

- Risks Associated with Low Level Asbestos Exposure
- Manufactured Mineral Fibers

Other Diseases

- Pleural plaques
- Pleural thickening
- Pleural effusion

Asbestos Diseases

- Risks Associated with Low Level Asbestos Exposure
- Manufactured Mineral Fibers

Cancers

- Esophagus
- Stomach
- Colon
- Pancreas

Other Diseases

- Pleural plaques
- Pleural thickening
- Pleural effusion

Asbestos Diseases

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Cancers

- Esophagus
- Stomach
- Colon
- Pancreas

Insurance & Bonding

General Liability

- Pollution Prevention
  - Occurrence
  - Claims Made

Workers' Compensation

- Bid Bonds
- Performance Bonds
- Payment or Labor & Material Bonds

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Section 2 Conducting the Inspection

Identifying Suspect Material

- Assume or test to determine asbestos content
- USEPA & state lists
- Commercial & residential buildings

TSI

www.TSItraining.com
Call 1-866-666-8438 Fax 1-866-813-9804
**Non-Suspect Materials**

- No testing needed for wood, metal or glass
- "Usually not, however..." materials
  - Cinder block, mortar, brick, house paint
- AHERA exemptions
  - Fiberglass, foam glass, rubber
- Ultimately inspector's decision

**Identifying Suspect ACM**

*Homogeneous Areas*

Is uniform in:

- color
- date of application
- texture
- use or system

and appears identical in every other respect

**Homogeneous Area**

**Texture**

Examines & describes all visible layers

Surfacing Materials

- loosely bound fireproofing
- tighter bound acoustical plaster
- corrugated (aircell) paper
- wrapped (compressed) paper
- block insulation
- cementitious (mudded) fittings
- batt insulation

*Ceiling Tile = surface patterns & texture*

**Homogeneous Area**

**Color**

Flooring - Different patterns & tile color

Does not include painted color of material

**Homogeneous Area**

**Date of Application**

Any indication of differing installation dates including material at:

- different wings of a building
- different floors
- special areas such as cafeterias, machine shops, band rooms

**Homogeneous Area**

**Use or System**

Surfacing/plasters

- fireproofing, ceilings, walls
- hot water supply and/or return
- cold water supply
- chilled water supply
- steam supply & return (watch for different pressure/temperature steam lines)
- roof or system drain
- chemical or waste transport
- roofing, and siding
Identifying Suspect ACM

Homogeneous Area (Extent)

Friable/Non-Friable

Material Type: Surfacing TSI Miscellaneous

Assessment: Location Condition Quantity Potential for Disturbance

Friable vs. Non-Friable

Can the material be crumbled, pulverized, or reduced to powder by hand pressure?

Categories of ACM

• Surfacing ACM
• Thermal System Insulation ACM (TSI)
• Miscellaneous ACM

Assessing ACM

• Includes category, condition, quantity, location, potential for disturbance
• Timing considerations
  Assessing during identifying & sampling: Reduces number of trips to site, Increases number of assessments conducted
  Assessing after receiving sample analysis: Reduces number of assessments conducted, Increases number of trips to site

Functional Space

Defined by the inspector
Up to entire building (no additions)
Down to room-by-room

Seven AHERA Categories

1. Damaged or significantly damaged thermal system insulation.
2. Damaged friable surfacing ACM
3. Significantly damaged friable surfacing ACM
4. Damaged or significantly damaged friable miscellaneous ACM.
5. ACBM with potential for damage.
6. ACBM with potential for significant damage.
7. Any remaining friable ACBM or friable suspected ACBM
**Condition**

<table>
<thead>
<tr>
<th>General Damage Category</th>
<th>AHERA Damage Category</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good</td>
<td>No Damage</td>
<td>No Damage (ASTM allows small amounts)</td>
</tr>
<tr>
<td>Fair</td>
<td>Damage</td>
<td>Up to 10% overall damage</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Over 25% localized damage</td>
</tr>
<tr>
<td>Poor</td>
<td>Significant Damage</td>
<td>Over 10% overall damage</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Over 25% localized damage</td>
</tr>
</tbody>
</table>

**Condition Factors**

- Type of damage
- Severity of damage
- Causes of damage
- Measures to prevent damage

**Quantity**

- Each HA in each functional space
- Surfacing material, miscellaneous material, and boiler, tank, & duct insulation in square feet (SF)
- Pipe insulation in linear feet (LF)
- Pipe fittings (elbows, tees, valves) counted (each)
- Bulk waste & stored materials in cubic feet (CF)

**Location**

- Identify each functional space HA is present
- Ideally locate all materials on drawings
- Use location descriptions familiar to owner/ survey users

**Potential for Disturbance**

**EPA Curriculum Model**
- Contact
- Vibration
- Air Erosion
- Overall

**ASTM E 2356 - 04**

- Physical Disturbances
  - Accessibility
  - Activities
- Environmental Disturbances
  - Vibration
  - Water damage
  - Air currents
  - Airborne dust
  - Corrosive atmosphere
### Potential for Disturbance

**Contact**
- **High**: Service workers work in the vicinity of the material more than once per week, or the material is in a public area (e.g., hallway, corridor, auditorium) and accessible to building occupants.
- **Moderate**: Service workers work in the vicinity of the material once per month to once per week, or the materials are in a room or office and accessible to the occupants.
- **Low**: Service workers work in the vicinity of the material less than once per month, or the material is visible but not within reach of the building occupants.

### Potential for Disturbance

**Vibration**
- **High**: Loud motors or engines present (e.g., some fan rooms), or intrusive noises or easily sensed vibrations (e.g., major airports, a major highway).
- **Moderate**: Motors or engines present but not obtrusive (e.g., ducts vibrating but no fan in the area), or occasional loud sounds (e.g., a music room).
- **Low**: None of the above

### Potential for Disturbance

**Air Erosion**
- **High**: High velocity air (e.g., elevator shaft, and fan room).
- **Moderate**: Noticeable movement of air (e.g., airshaft, ventilator air stream).
- **Low**: None of the above

### Potential for Disturbance

**Overall**
- **High**: Any high rating
- **Moderate**: At least one moderate
- **Low**: No high or moderate ratings

### Bulk Sampling Equipment
- Ladder and flashlight
- Barrier tape and signs
- Airtight sampling containers
- A plastic spray miser bottle
- Plastic drop cloths
- Tools for extracting samples
- Patching materials, tape, adhesives
- Cloths or towelettes for cleaning up debris and tools
- HEPA vac
- Indelible ink pen for labeling sample containers;
- Camera for photographic documentation; and
- Tape measure

### Bulk Sampling Guidelines
1. Sample after working hours or when the building area is not in use.
2. Random locations consider to safety, occupant & damage issues
3. Intact core samples assure all layers will be included
4. Chemically exposed and water damaged areas – Optical issues
5. Additional sampling considerations with materials near 1%
6. Rigid sample containers, not plastic bags, sample # on container
7. Steam lines & hot water lines may need to be cooled and depressurize.
8. Record sample location and number, use photographs
9. Use wet methods (water & surfactant) for most materials.
10. Clean and decontaminate sampling tools between each sample.
11. Patch sample hole
**Sampling Protocols**

### Surfacing Material

- **AHERA requires a minimum number of samples based on square footage**
- Square footage based on material in HA throughout building
- EPA recommends British 'Pink Book' used to determine sample locations

<table>
<thead>
<tr>
<th>Size of the Homogeneous Sampling Area</th>
<th>AHERA Minimum Number of Samples to be Collected</th>
<th>Recommended Number of Samples to be Collected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 1,000 ft²</td>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>Between 1,000 &amp; 5,000 ft²</td>
<td>5</td>
<td>9</td>
</tr>
<tr>
<td>Greater than 5,000 ft</td>
<td>7</td>
<td>9</td>
</tr>
</tbody>
</table>

### Thermal System Insulation

At least three (3) random samples except:

- **Exception 1** - Patch - 1 sample
- **Exception 2** - Mudded fittings
  - determined by the inspector
  - rule of thumb is 3 samples
- **Exception 3** - Non-ACM materials

### Miscellaneous & Non-Friable

- AHERA states in a manner sufficient
- Site mixed vs. manufactured
- 'bulk samples' means at least 2

<table>
<thead>
<tr>
<th>Mixed &amp; applied on-site</th>
<th>• Hard ceiling plaster (ACM usually in finish coat)</th>
<th>AHERA 3-5-7 rule</th>
<th>Consider 9 per HA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>- Hard ceiling plaster</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Hard wall plaster</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**TSI** P.23

**TSI** P.23

**TSI** P.24
Sampling Protocols

Miscellaneous & Non-Friable

<table>
<thead>
<tr>
<th>Small manufactured items</th>
<th>Minimum 2 per HA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vibration joint cloth</td>
<td></td>
</tr>
<tr>
<td>Gaskets</td>
<td></td>
</tr>
<tr>
<td>Friction products</td>
<td></td>
</tr>
</tbody>
</table>

Vermiculite Sampling & Analysis

Characteristics

- Bound in matrix of other materials
- Loose fill

Examples of Vermiculite Uses and Characteristics

<table>
<thead>
<tr>
<th>Vermiculite bound in matrix of another material</th>
<th>Vermiculite exists as loose fill</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Gypsum plaster</td>
<td>- Attic insulation</td>
</tr>
<tr>
<td>- Fireproofing Insulation</td>
<td>- Masonry fill</td>
</tr>
<tr>
<td>- Acoustic finishes</td>
<td>- Lightweight concrete</td>
</tr>
<tr>
<td>- Paints</td>
<td>- Potting soil</td>
</tr>
<tr>
<td>- Sealants</td>
<td>- Soil conditioners</td>
</tr>
<tr>
<td>- Lightweight concrete</td>
<td>- Absorbent packing</td>
</tr>
</tbody>
</table>

Vermiculite Sampling & Analysis

Sampling and Analysis Alternatives

Traditional PLM & TEM Bulk Sampling & Analysis

- Obtain all layers of material
- Best suited for vermiculite bound into a material
- Not designed for applications where asbestos coexists and is not bound to other material
- Bound vermiculite materials have same considerations as traditional asbestos materials including fiber size and binder type when considering PLM vs. TEM, gravimetric, and point counting.
- Amount of material may not be sufficient for reliable negative determination with loose fill vermiculite
- Ranges of fiber size in loose fill vermiculite makes it difficult to choose only PLM or TEM

Cincinnati Method

- Good portion of sampled material should be taken from bottom of application
- 1-gallon size samples
- 3 samples recommended
- Too much water effects sample drying during analysis
- Use of surfactant effects analysis of smaller amphiboles
- Analysis involves both PLM and TEM analysis
- Reliability of results may be limited to asbestos presence, not % in sample
- Reliable negative determination for amphibole asbestos, not chrysotile

Research Method for Sampling and Analysis of Fibrous Amphibole in Vermiculite Attic Insulation

EPA/600/R-04/004

“The Cincinnati Method”

EPA/600/R-04/004

“The Cincinnati Method”

The Cincinnati Method - Tools

- Scoop, metal (approx. 12 x 5 cm) with a flat edge
- One gallon reusable plastic bags
- Sample labels & makers
- Chain-of-custody forms
Vermiculite Sampling & Analysis

The Cincinnati Method - Sampling
- Do not use amended water
- Thrust metal scoop into vermiculite until scoop reaches bottom (substrate)
- Move along bottom
- Raise through material
- Place into 1-gallon bag
- Repeat at location until full
- Take minimum of 3 samples

Vermiculite Sampling & Analysis

The Cincinnati Method – Sample Prep
- Dry sample for 2 hours @ 100°C
- Weigh before and after drying

Vermiculite Sampling & Analysis

The Cincinnati Method - Analysis
- Prepare sub-sample 5-50 grams
- Introduce into aqueous solution
  - Vermiculite floats
  - Large amphiboles sinks (PLM)
  - Small amphiboles suspended (TEM/SEM)
- % weight results 0.01%-100%

Non-friable Organically Bound Materials

- NOB’s
  - tar, roofing materials, mastic, glue, and floor tile
- ASTM Recommendations
  - PLM w/ <1% or NAD not reliable
  - Confirm w/ TEM gravimetric
- State requirements
  - Some may require TEM gravimetric reduction

Asbestos Dust Sampling

ASTM Method D 5756-02
- Microvac collection
- 25 or 37 mm air sampling cassette w/ plastic tube
- Quantitative TEM analysis
**Soil Sampling**

- Protocols not well established
  - Consider sampling techniques, locations, analytical methods, interpretation of results
  - Sampling should represent surface area & depth for soil in question
  - Use of grid often used
- Example of method used at USEPA Ft. Chaffee project

**Analyzing to 1st Positive**

Also called ‘Positive Stop’

<table>
<thead>
<tr>
<th>Pros</th>
<th>Cons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saves time and money</td>
<td>Laboratory knows samples from same HA</td>
</tr>
<tr>
<td></td>
<td>No sample results to confirm material is same</td>
</tr>
</tbody>
</table>

**Analyzing Bulk Samples**

- **Polarized Light Microscopy**
  - Visual Estimation Technique
  - Gravimetric Reduction
  - Point Count Technique

- **Transmission Electron Microscopy**
  - Basic Method
  - Gravimetric Reduction

**Sample Analysis Results**

- Total amount of asbestos in each layer
- Each type and percent of asbestos identified in each layer
- Field (inspector’s) sample number & description
- Laboratory sample number & description or appearance
- Each layer’s description/name
- Non-asbestos materials and percentages
- Name and signature of analyst
- Analytical method used and laboratory quality control certifications

**Asbestos Analysis Results**

- Chrysotile
- Amosite
- Crocidolite
- Actinolite
- Tremolite
- Anthophylite
Quality Assurance
Laboratory Accreditation

Use nationally recognized program

Expiration Date?

Comparing Quality Assurance Split Sample Results

<table>
<thead>
<tr>
<th>Variation in Analysis</th>
<th>Level of Concern</th>
</tr>
</thead>
<tbody>
<tr>
<td>One sample analyzed as ACM, other sample non-ACM</td>
<td>Major concern - must have additional analysis from same or different labs</td>
</tr>
<tr>
<td>Type of asbestos indicated in samples are different</td>
<td>This is a concern that should be investigated further and remedied</td>
</tr>
<tr>
<td>Percent (%) of asbestos varies between samples</td>
<td>Some degree should be expected.</td>
</tr>
</tbody>
</table>

Respiratory Hazards

Categories of Respiratory Hazards

- Oxygen Deficiency
- Toxic Contaminants
  - Asbestos

Types of Toxic Contaminants

- Particulates
- Gases
- Vapors

Asbestos

Controlling Respiratory Hazards

- Assess the hazard
- Bulk Sampling
- Air Sampling

- Reduce or eliminate the hazard
- Work practices & engineering controls

- Provide respiratory protective equipment
- Proper respirators & filters

Use of Respirators

When do I have to wear a respirator?
1. ACM not removed intact
2. Wet methods not used
3. Exposure above PEL/ no NEA exists

When do I not have to wear a respirator?
1. Wet methods used
2. NEA exists
3. ACM removed intact
Types of Masks & APF’s

- OSHA has assigned protection factors for each respirator face piece
- Filtering facepiece (Dust mask) not for asbestos use

Half-Mask Air-Purifying
- PF=10

Types of Masks & APF’s

- Full Facepiece Air-Purifying
  - PF=10 (qualitative), 50 (quantitative)

Types of Masks & APF’s

- Full facepiece supplied air w/ SCBA escape
  - PF=1000+

Respirator Selection

- OSHA varies based on material
  - Class I - Asbestos Standard
  - Class II & III Respiratory Standard

- Recommend following Class I requirements
  - Always legal
  - Best protection – 0.01 f/cc in mask
**Respirator Selection**

- Class I requirements – most stringent

<table>
<thead>
<tr>
<th>Required Respirator for Class I Activities</th>
<th>Air Levels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Half-Mask Air Purifying</td>
<td>Any exposure up to 0.1 f/cc</td>
</tr>
<tr>
<td>Full Facepiece Air-Purifying</td>
<td>Any exposure up to 0.1 f/cc</td>
</tr>
<tr>
<td>Powered Air-Purifying (PAPR)</td>
<td>0.1 f/cc - 1.0 f/cc</td>
</tr>
<tr>
<td>Full Facepiece Supplied Air</td>
<td>Over 1.0 f/cc</td>
</tr>
</tbody>
</table>

**Maximum Use Concentration & Respirators for non-Class I work**

\[
MUC = \text{Respirator’s APF} \times 0.1 \text{ f/ccc}
\]

(Assbestos 8-Hr TWA PEL)

Highest allowable use level for Class II & III

Recommend at least 0.01 f/ccc inside mask

**Respirator Selection**

Class II & III, not Class I

<table>
<thead>
<tr>
<th>Respirator (Class II &amp; III Activities)</th>
<th>MUC (APF x PEL)</th>
<th>Recommended Use Concentration (APF x 0.1 f/cc)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Half-Mask Air Purifying</td>
<td>1.0 f/ccc</td>
<td>0.1 f/ccc</td>
</tr>
<tr>
<td>(10 x 0.1 f/cc)</td>
<td></td>
<td>(10 x 0.01 f/cc)</td>
</tr>
<tr>
<td>Full Facepiece Air-Purifying w/</td>
<td>1.0 f/ccc</td>
<td>0.1 f/ccc</td>
</tr>
<tr>
<td>Qualitative Fit Test</td>
<td>(10 x 0.1 f/cc)</td>
<td>(10 x 0.01 f/cc)</td>
</tr>
<tr>
<td>Full Facepiece Air-Purifying w/</td>
<td>5.0 f/ccc</td>
<td>0.5 f/ccc</td>
</tr>
<tr>
<td>Quantitative Fit Test</td>
<td>(50 x 0.1 f/cc)</td>
<td>(50 x 0.01 f/cc)</td>
</tr>
<tr>
<td>Powered Air-Purifying (PAPR)</td>
<td>10.0 f/ccc</td>
<td>10.0 f/ccc</td>
</tr>
<tr>
<td>Full Facepiece</td>
<td>(1000 x 0.1 f/cc)</td>
<td>(1000 x 0.01 f/cc)</td>
</tr>
</tbody>
</table>

**Types of Filters**

- HEPA = 99.97% @ 0.3 µm
- Purple or magenta colors
- NIOSH approved
- Proper rating

<table>
<thead>
<tr>
<th>NIOSH Efficiency Rating</th>
<th>NIOSH Oil Mists/ Solvents Resistance Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>95</td>
<td>Not resistant</td>
</tr>
<tr>
<td>99</td>
<td>Resistant up to 1 shift</td>
</tr>
<tr>
<td>100</td>
<td>Oil proof, resistant over 1 shift</td>
</tr>
</tbody>
</table>

**NIOSH Efficiency Rating**

95 95% of particles

99 99% of particles

100 99.97% of particles @ 0.3 µm
Types of Filters

<table>
<thead>
<tr>
<th>Filters Approved for Asbestos</th>
</tr>
</thead>
<tbody>
<tr>
<td>N 100</td>
</tr>
<tr>
<td>R 100</td>
</tr>
<tr>
<td>P 100</td>
</tr>
</tbody>
</table>

User Seal Checks

- Every time
- Negative pressure check
  - Close off inlets
  - Inhale collapsing facepiece slightly
  - Seal should hold for 10 seconds
- Positive pressure check
  - Close off exhalation valve
  - Exhale gently 10 seconds w/o leakage

Fit Tests

- Annually
- Exercises
- Qualitative
  - 4 solutions
  - Advantages/disadvantages
- Quantitative
  - 3 methods
  - Fit factor values
- Acceptable methods

Respirator Care

- Cleaning
  - Warm soapy water wash
  - Clean water rinse
  - Air Dry
- Maintenance
  - Routine inspections
  - Repair w/ qualified personnel & parts
- Storage
  - Protect from damage
  - Plastic bag

Protective Clothing

- Keeps asbestos off body
- Usually disposable
- Required above PEL or no NEA
- Wearing requirements
  - Don prior to entering regulated area
  - Remove in decon
    - Dirty Equipment Room w/ 3 or 5 stage decon
    - Dropcloths outside work area on small/intact projects
- Disposable
- Room unoccupied
- HEPA vac suit using buddy system
- Take suit off inside-out, rolling suit down body
- Dispose of suit as asbestos waste

Protective Clothing Removal procedure:

- Proceed to decontamination area
- HEPA vac suit using buddy system
- Take suit off inside-out, rolling suit down body
- Dispose of suit as asbestos waste
Other PPE

- Head protection
- Eye & face protection
- Foot Protection
- Hand protection

Proper respirator use?

Section 4 Medical Surveillance

TSI www.TSItraining.com
Call 1-866-666-8438 Fax 1-866-813-9804

Medical Surveillance Triggers

- Respirator Approval
  - Doctor’s or physician's authorization required
  - Prior to wearing respirator
- Medical surveillance program required
  - 30 Days of Class III work or exceeding PEL
  - W/in 10 days of 30th day

Exam Content

- Respirator approval
  - Physician’s signature
- Medical surveillance program

<table>
<thead>
<tr>
<th>Exam Component</th>
<th>Initial</th>
<th>Annual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical questionnaire/history</td>
<td>Comprehensive</td>
<td>Abbreviated</td>
</tr>
<tr>
<td>Comprehensive medical evaluation</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>determined by licensed physician</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pulmonary function tests</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>
| Chest X-rays interpreted by a B reader  | Usually, up to physician | Usually every 2-5 yrs, up to Dr.

Exam Results

- Reports signed by physician
- Surveillance exams conducted in accordance w/ 29 CFR 1926.1101
  - Kept for 30 years past last date of employment
  - Available upon request
  - Example form p. 39
Section 5
Utilizing the Survey Information

Regulatory Application

<table>
<thead>
<tr>
<th>Regulated Levels of Asbestos</th>
<th>Amount of Asbestos in Homogeneous Area</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>None Detected (0%)</td>
</tr>
<tr>
<td>AHERA 40 CFR Part 763 subpart E</td>
<td>No</td>
</tr>
<tr>
<td>NESHAP 40 CFR Part 61 subpart M</td>
<td>No</td>
</tr>
<tr>
<td>OSHA 29 CFR 1926.1101</td>
<td>No</td>
</tr>
<tr>
<td>Ohio, Indiana, Illinois, New York, and most other states</td>
<td>No</td>
</tr>
</tbody>
</table>

Federal Asbestos Regulations

OSHA (29 CFR 1926.1101)
- All asbestos jobs covered
- Class I – Removal of TSI & surfacing
- Class II – Removal of all materials except TSI & surfacing
- Class III – any repair up to 1 glovebag or disposal bag
- Class IV – cleanup where ACM is contacted but not disturbed
- Unclassified operations
- PACM - Presumed Asbestos-Containing Material.

Federal Asbestos Regulations

NESHAP (40 CFR Part 61 Subpart M)
- Category I NF (pliable)
- Category II NF (brittle, rigid)
- RACM – basically any currently or will become friable material
- Notification requirements
- Emission control procedures
- Disposal requirements

Federal Asbestos Regulations

AHERA (40 CFR Part 763 Subpart E)
- All LEA’s - public or private, not-for-profit school system consisting of grades K-12.
- Manage/abate all asbestos containing building material (ACBM)
- Response actions include all friable asbestos abatement projects conducted in a school building or on exterior mechanical components.
State Asbestos Regulations

- Various trigger levels and requirements

THE END